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SPECIAL REPORT

Equipment Investment Spurs Economic Growth

A new study by Harvard University professors J. Bradford De Long and Lawrence H. Summers finds a strong link between investment in producers' durable equipment and economic growth.[1] Highlights of their study are presented below. They find that each one percent of gross domestic product (GDP) invested in equipment causes GDP to increase by one-third of a percentage point per year. This is a much stronger association than can be found between growth and any of the other components of investment.

Traditional Economic Growth Theory

Economic historians credit industrialization and mechanization with the boom in European economic growth that began in the 1760s. Modern quantitative studies of economic growth, however, have tended to downplay the role of mechanization, according to De Long and Summers. Economists such as Robert Solow and Edward F. Denison, and others, have typically concluded that capital accumulation accounts for only a relatively small fraction of productivity growth in individual countries, or of differences across countries. Capital accumulation, in the view of Solow and others, can make only a modest contribution to accelerating growth. Even a doubling of the U.S. net private investment rate would, according to standard estimates, raise the growth rate of real income by less than half a percentage point per year.

The De Long and Summers study provides quantitative evidence in support of the older, traditional view that the accumulation of machinery is a prime determinant of economic growth.

Results of the Study

De Long and Summers analyze the effect of electric and non-electric equipment investment on economic growth using data from the United Nations International Comparison Project for a sample of twenty-five high-productivity countries.[2] They reason that the centrality of machinery in historical discussions of growth suggests the importance of disaggregating total investment in considering its relation to economic growth. If machinery and structures contribute differently to growth, then analyses of the relationship between total capital accumulation (equipment plus structures) and growth are likely to be very misleading.

The De Long and Summers study shows that nations that invested heavily in equipment relative to other nations at the same stage of economic development enjoyed rapid growth over the 1960–1985 period (see Figure 1). In evaluating the contribution of equipment investment to growth, the authors hold constant labor force growth rates, the share of GDP devoted to non-equipment investment, and the level of GDP per worker. The results of the regressions underlying Figure 1 imply that an increase of 3 percentage points in the share of GDP devoted to equipment investment leads to an increase in the growth of GDP per worker of 1.02 percent per year, which cumulates to a 29 percent difference over the twenty-five years of the sample. This means, for example, that differences in equipment investment account for essentially all of the extraordinary growth performance of Japan relative to the sample as a whole. Japan achieved a relative GDP per worker growth rate edge of 2.2 percent per year over 1960-1985 relative to the average, and a 5 percent per year edge relative to Argentina. In both cases, more than four-fifths of this difference is accounted for by Japan's high relative quantity of equipment investment.

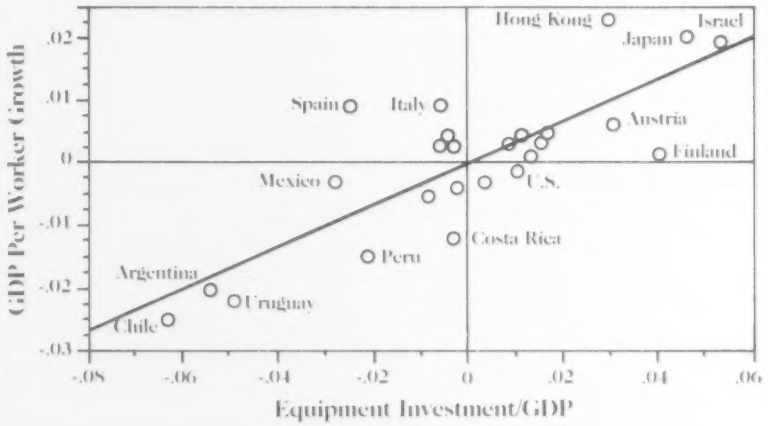
De Long and Summers conclude that one reason to believe that equipment investment causes growth, rather than to believe that growth causes investment, is that if

[1] J. Bradford De Long and Lawrence H. Summers, "Equipment Investment and Economic Growth," mimeographed (Cambridge, Mass.: Harvard University and National Bureau of Economic Research, September 1990).

[2] High-productivity countries are defined as those whose 1960 levels of GDP per worker exceed 25 percent of the U.S. level. Economic growth is defined as the growth rate of GDP per worker, measured in international dollars.

growth caused investment there would be a similar association between structures investment and growth. Rapid economic growth raises the potential profits from investing in equipment and thus induces firms to invest in order to establish and entrench market positions, but it also raises the profits earned by structures. Favorably located land is in fixed supply, and larger structures economize on the use of such land. One might therefore imagine that faster economic growth would tend to shift the use of savings away from producers' equipment and toward structures. Yet it is equipment investment, not structures investment, that is associated with rapid growth in their study.

Figure 1
Economic Growth and Equipment Investment, 1960–1985



Conclusions and Policy Implications

The study makes a persuasive case for a strong association between equipment investment and growth. The relationship between rates of equipment investment and growth accounts for a substantial part of the variation in rates of growth among the countries in their sample. The authors believe that previous studies, which failed to find much correlation between capital accumulation and economic growth, were flawed because they did not disaggregate equipment from structures investment.

The study shows that the benefit to society as a whole—the social return—from equipment investment is at least 30 percent per year. Much of this return accrues to society rather than to private investors. If these results stand up to scrutiny, they have obvious implications. The gains from raising equipment investment through tax or other incentives dwarf the losses that might result from differences in effective tax rates on the various components of investment. A 20-percentage-point-per-year wedge between the social return to equipment and other investment has implications for all policies affecting saving and capital allocation.

De Long and Summers also note that the finding that equipment investment is so important for growth suggests an explanation for the striking differences in economic performance realized by nations with "interventionist" governments that have tried to jump start economic growth. The key difference between countries ruled by "interventionist" governments in South America and East Asia lies in their quantities of equipment investment. Why is it that South America (with the exception of Brazil) and Africa have for the most part had slow economic growth, while East Asian economies with activist governments have done so well? De Long and Summers suggest that the poor performers have confused support for *industrialization* with support for *industrialists*. Policies that try to increase the health of the equipment sector by enriching producing industrialists end up raising prices and reducing quantities and thus are counterproductive—even though existing industrialists are happy with such policies. Government policies that increase the quantity of equipment investment by encouraging purchases appear to have been more successful. The divergence in the relative quantity and price structures for equipment in these countries carries an important insight into what a successful "industrial policy" is and how it should be implemented.

The study suggests that U.S. policymakers would be well advised to consider tax incentives that target investment in equipment because of the positive impact on economic growth.

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